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HEALTH STATUS OF THE ALASKA NATIVES ACCIDENTS AND INJURIES

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HEALTH STATUS OF THE ALASKA NATIVES: ACCIDENTS AND INJURIES

Based on the twenty-two causes of death reported by the state of Alaska in their yearly reports, accidents has been as the number one cause of death among Alaska Natives every year since Tuberculosis was brought under control in the mid 1950's. Currently, approximately one out of every four Alaska Native deaths is due to accidents, compared to a figure of one in twenty for the total United States (State of Alaska, 1978). In addition, the treatment of accidental and purposely inflicted injuries is the first leading cause of hospitalization and the second leading cause of outpatient first visits at IHS direct and contract health facilities in Alaska. The predominance of accidents and injuries as a health problem among Alaska Natives has significant consequences in regard to their general state of health. For example, the increasing occurrence of accidental deaths in the younger age groups (age 15-30) has been implicated as a factor which has suppressed increases in the overall life expectancy in spite of significant advances in other areas of health. The purpose of this report is to provide further documentation of this health problem by detailing relevant trends and characteristics.

Data

Data used in this report cover both mortality and morbidity resulting from accidental injuries. Data on purposely inflicted injuries are also included in the sections on morbidity. The mortality data for Alaska Natives came from special computer printouts provided by the State of Alaska's Office of Information Systems. Because of the nearly complete recording of deaths by means of death certificates, these data provide a reasonably complete and accurate representation of the total mortality due to accidents.

As opposed to mortality, it is not possible to accurately assess the total rate of morbidity resulting from accidents and injuries among Alaska Natives. This measurement problem stems from the various levels on which morbidity can be treated and reported and from the lack of nearly universal coverage of events such as exists for the reporting of deaths. Morbidity among Alaska Natives resulting from accidents and injuries can be treated on three general levels roughly corresponding to the seriousness of the problem and, within each of the levels, treatments may or may not be reported into a data system in a form usable for the calculation of general morbidity rates. Ignoring the small percentage of Natives who may seek and pay for treatment by private physicians, the three levels of treatment and the data systems which exist on each level are: a) nonformal treatment in the home by the individual, family member etc., for which no data is available. b) treatment on an outpatient basis by a health aide with data sometimes tabulated by native health corporations, or by health professionals at IHS or contract outpatient clinics with data reported into the APC system, c) treatment in an IHS

or contract inpatient facility with data reported into the IHS inpatient system. In both the inpatient and outpatient reporting systems, IHS and contract information are maintained separately.

In order to calculate an overall accident and injury rate complete data from all levels would be needed. Even if one were to eliminate the first level as being of minor importance and consider only those injuries serious enough to require formal medical attention, the data are still not complete. While the inpatient data is relatively complete and accurate, data on health aide visits are not formally compiled in all regions and the contract outpatient reporting is not comprehensive either. Furthermore, the good deal of redundancy which occurs between existing inpatient and outpatient data systems (e.g. due to persons being treated on both on inpatient and outpatient basis for the same problem) as well as other problems of comparability would further preclude accurate computations even if the data were complete.

This report considers only data reported into the direct and contract outpatient and inpatient reporting systems. Although it is not possible to determine an overall accident and injury morbidity rate by combining these inpatient and outpatient statistics, the data from each system can be used to calculate selective rates for each type of treatment and to provide information on patterns and trends of morbidity in regards to variables such as age and cause of accident. However, it should be remembered that rates or other calculations based on either inpatient or outpatient data alone apply only to accidents requiring that particular level of treatment and patterns described within that level do not necessarily represent the situation for all levels of treatment.

Methods.

Three year average mortality statistics were calculated for the time period 1975-77 and, for comparison purposes, for the periods 1959-61 and 1969-71 as well. Using 3-year average rather than annual figures provides for more stable estimates of trends in cases such as this where the number of deaths each year is relatively small. Inpatient and outpatient data are reported for fiscal year 1978 and 1972. (the earliest year in which comparable data are available). Three year averages were not used as numbers were larger in this case. Because the data came from different reporting systems, the breakdown by cause of accidents is not the same in each case, although there are many similarities. The categories used in each of the breakdowns are defined in Figure 1 according to the ICDA codes (8th revision) used in each case. After preliminary analysis, some categories in Figure 1 in which few numbers occurred were combined with the "other" category.

Throughout this report, chi-square tests are used to test for statistical significance of differences between rates, proportions, etc. One way goodness of fit tests are used as well as two-way tests of independence. In all cases the .05 level of significance is used.

Mortality from Accidents

During the period 1975-1977, there were 407 accidental deaths (excluding those purposely inflicted by self or other) among Alaska Natives, an average annual rate of 213.7 deaths per 100,000 population. This rate is essentially the same as the rate of 213.2 for the 1969-71 period and only slightly higher than the rate of 205.0 for the period 1959-61. Including suicides and homicides in the calculation results in a total of 526 deaths during 1975-1977 and an average annual rate of approximately 276 deaths per 100,000 population. Looking at it another way, twenty-nine percent of all Native deaths during 1975-77 were due to accidental injuries, and purposely inflicted injuries accounted for another 9 percent of the total.

While the population death rate from accidental injuries has remained essentially constant over time, the proportion of the total deaths has increased since 1959-61 as indicated in Figure 2. The figure shows that the relative importance of accidental deaths as a health problem has increased by almost 50 percent since 1959-61. The major part of this increase occurred between 1959-61 and 1969-71, the difference between the last two time periods being not statistically significant at the .05 level using a chi-square test. Comparison of both later time periods with 1959-61 are however highly significant.

Accidental deaths by cause. Cause specific accidental death rates are given in Table 1, ranked in descending order of magnitude in 1975-77. A chi-square analysis was done on the 1975-77 data and the brackets in the table indicate those groups of causes (excluding the "other" category) within which differences were found to be not statistically significant (using the .05 level of significance). Motor vehicle accidents was the leading cause of accidental death in 1975-77, followed by deaths from drowning and water transportation (between which the difference in rates was not statistically significant). It is interesting to note that forty-five of the fifty water transportation deaths were due to drownings and had they been recorded as such, would have made that category the leading cause.

There has been considerable change in the relative rankings of the leading causes over time. Motor vehicle deaths moved from being the fifth leading cause of accidental deaths in 1959-61 to second in 1969-71 and then to first leading cause in 1975-77. Fire deaths, on the other hand, dropped from first leading cause in 1959-61 to fourth leading cause in the later two time periods. Water transportation deaths were first in 1959-61 and third in the other two time periods. Of the changes occurring among the other causes of death, the most notable are the rise of deaths due to exposure from the eighth leading cause in 1959-61 to the fifth in 1975-77, the rise of aircraft accidents from tenth to sixth leading cause, and the drop of suffocation from fourth to tenth leading cause.

The current percentage distribution of accidental deaths among Alaska Natives is compared to that for the U.S. total population in Figure 3. As might be expected, the graph shows differences in the pattern of accidental deaths among Alaska

Natives which are in a large part due to the characteristic forms of transportation used. The percentage of Alaska Native accidental deaths due to motor vehicle accidents, while currently two and one half times greater than it was in 1959-61, is still at about half the figure for the U.S. total population. On the other hand, the percentage of accidental deaths due to water transportation is approximately eight times greater than the U.S. total figure and for aircraft related deaths it is almost twice as high. Other notable differences in the graph (not related to transportation) are the greater proportion of drownings among Alaska Natives and a smaller percentage of deaths due to falls.

Inpatient Treatment of Accidents and Injuries*

As mentioned above, the inpatient statistics are relatively complete and accurate for both IHS direct and contract health care facilities. These data can thus be used to calculate rates and other measures which can be interpreted as describing the risks of being hospitalized as the result of accidents or injuries. As such, these figures are indicative of the incidence and characteristics of the more serious non-fatal accidents and injuries (as opposed to those which require only outpatient treatment).

During fiscal year 1978, there were 2240 admissions to IHS direct and contract hospitals in Alaska for the treatment of accidents and injuries. This represents a rate of 34.0 admissions per 1,000 Alaska Natives. This figure is graphed along with rates for fiscal years 1972 through 1977 as the solid line in Figure 4. The graph shows that the risks of hospitalization for treatment of accidents and injuries decreased noticeably from FY 1972 to FY 1975 but has remained essentially constant since that time. The rate for FY 1978, because it is higher than the figures for three previous years, might suggest the beginning of an increasing trend. However, it could be interpreted with equal validity as only a minor fluctuation from the level trend established in FY 1975.

As mentioned above, the hospitalization rate for accidents and injuries can be interpreted as an indicator of the incidence of serious accidents and injuries in the population, and, at any one point in time, this is an accurate interpretation. However, in comparing data across time as in Figure 4, it is not possible to attribute all of the year-to-year rate variations to changes in the actual occurrence of serious injuries since changes have also been occurring in the type of conditions which require hospitalization. Specifically there has been a trend towards increasing outpatient treatment of conditions previously treated on an inpatient basis.

In the remainder of the report the terms "accidents and injuries", and "injuries" are used interchangeably to refer to accidental injuries plus injuries purposely inflicted by oneself or others.

This trend has resulted in an overall decline in hospital admission rates which could have in turn created the decline in admissions for accidents and injuries reported in Figure 4, regardless of the actual incidence pattern. More simply, if you define serious injuries as being those serious enough to require hospitalization, and the standards for hospitalization change over time as it has in this case, then differences in rates between years will reflect the changing standards in addition to any actual changes in the occurrence of injuries.

The effects of the changing incidence of accidents and the changing overall pattern of treatment that in combination form the solid line in Figure 4 can be separated by dividing or partitioning the rates into the parts corresponding to each of these two effects. Such calculations are only estimates and their accuracy depends on the validity of the assumption that the change over time in the total hospitalization rate is in fact due primarily to changes in admission standards or practices. These data are presented as the other two lines in Figure 4. The dotted line in the graph was calculated by dividing the overall hospitalization rate in each year by the rate in the base year, FY 1972, and then applying the resulting ratios to the hospitalization rate for accidents and injuries in FY 1972. This line can be interpreted as measuring the change in the hospitalization rate for accidents and injuries that would have occurred due to the overall change in hospital admission practices even though the actual incidence rate of injuries remained at the same level as in FY 1972. That this line closely approximates that of the actual hospitalization rate without the use of any specific information on hospitalizations for injuries (except for the base year) in the calculation suggests that the decline in the risks of hospitalization for accidents and injuries is more a function of the general trend in hospital admission practices rather than a reduction in the occurrence of serious accidents.

The dashed line in Figure 4 was calculated by applying the same ratios as above but to the hospitalization rate for injuries in each year rather than to the base year only. By compensating for changing admission practices, this procedure provides a constant definition of "serious injuries" (in this case, accidents serious enough to have required hospitalization in FY 1972), and thus produces estimates of the actual incidence rates of such injuries which are independent of changing admission practices. (The definition of serious accidents is arbitrary in that any other year besides FY 1972 could have been used as the base year. All such definitions would produce lines parallel to the one calculated here so the trend would remain the same). This line shows that the estimated incidence rate of the more serious accidents and injuries has actually increased since FY 1972 and suggests that had there not been a decline in overall admissions, the hospitalization rate for accidents and injuries would have increased as well.

Age differences in hospitalization for injuries. Age-specific hospitalization rates for treatment of accidents and injuries among Alaska Natives during FY 1978 are presented in Table 2. Because actual counting of the population by age is generally only done during census years, age

distributions in intercensal years must be estimated. Since the accuracy of these estimates affects the accuracy of any age-specific rates calculated from them, it is very important to use the most accurate estimates available. Table 2 illustrates the variation that can occur. These calculations used the same accident and injury statistics and the IHS official population total, but are based on two different estimates of the age distribution of the Alaska Native population in FY 1978: the official Indian Health Service estimates and estimates calculated by Buffler and Kraus (1978). The IHS estimates assume the same age distribution as in 1970 while Kraus extrapolated from the 1970 figures using birth and death statistics. Because the Kraus figures are considered to be the more accurate, the remainder of the calculations will be given using those figures only. (Most calculations using the two sets of age distributions showed the same basic patterns except the the IHS figures tended to create greater differences between groups and over time).

In general, the age specific rates show that the risks of hospitalization start out lowest in the youngest age group, increase to a peak between the ages of 20 and 24 and then decline after that until age 45 when the line levels off. The rate of 63.6 for the 20-24 year old group was 30 percent larger than the next highest rate of 48.9 for those between 25 and 44. A chi-square analysis showed that the difference in rates between the youngest two age groups was not statistically significant, nor was the difference between the oldest two age groups. This indicates that increased susceptibility to accidents and injuries does not occur until around the tenth year and that the decline after ages 20-24 obtains a constant level around the age of 45.

Another way of analyzing the data in regard to age is to compare the percent distribution of hospitalization for accidents and injuries by age to the percent distribution of the population by age. Taking the ratios of these two percentage figures for an age group produces an index of the degree to which hospitalizations for injuries occur disproportionately within that age group. A ratio of 1.0 indicates that the risk of hospitalization for accidents in that age group is equal to the average for the total population while a ratio greater than one indicates a greater than average risk of being hospitalized. Similarly, a ratio of less than one indicates a less than average risk. In addition to providing a method for identifying high risk age groups, this method allows for easy comparison of changes over times as it compensates for both changes in the age distribution as well as in the total admission rate. These ratios are graphed in Figure 5 for FY 1978 and FY 1972. (The age groups 15-19 and 20-24 previously shown separately for FY 1978 were combined because data for the two groups from 1972 were not available separately).

The graph shows that the 15-24 year old age group has only recently outranked those 25-44 in having the highest risks of hospitalization for injuries. This switch was due primarily to an increase in risks for those 15-24 as the change in risks over time for those 25-44 was not statistically significant. The 45-65 year old group showed a significant decline over time which in FY 1978 put them at about the same level of risk as those

age 65 and over. Chi-square tests showed that the risk for these two groups in FY 1978 were not statistically different from one another nor from the average for the total population. The difference between the two age groups under 10 years old and those 10 to 14 was not statistically significant in 1972. However, while risks for those between 10 and 14 increased over time, the risks for the youngest two age groups declined. This differential change resulted in the FY 1978 condition (also evident in Table 2) in which those under age 10 were at less than half the risk of hospitalization for injuries as those age 10-14.

Hospitalization for injuries by cause. Table 3 gives the distribution of hospital discharges for all causes of accidents and injuries for which there were at least 25 discharges in fiscal year 1978. These thirteen causes accounted for 86 percent of the total discharges for accidents and injuries. (Because the relative importance of the different causes is in part dependent on the manner in which they are grouped, the breakdown used should be kept in mind when considering the results given).

Injuries resulting from falls was the leading cause of hospitalization, followed by motor vehicle accidents and injuries purposely inflicted by others. Together, the three leading causes accounted for nearly half (46 percent) of all hospitalizations for accidents and injuries in FY 1978. A chi-square analysis of Table 3 showed that there were two sets of leading causes, indicated by the brackets in the table, within which the differences in percentages were not statistically significant. (The "other" category was not included in the chi-square analysis.) On the average, each cause within the first bracketed group accounted for approximately 6.8 percent of the total hospitalizations for accidents and injuries in FY 1978. The average was 1.9 percent for the second group.

Table 4 ranks the thirteen causes of accidents and injuries in descending order according to the amount of increase in the percent of total accidents since FY 1972. The figures in the table were calculated by taking the ratio of the percent of the total accidents in FY 1978 to that in FY 1972. Thus, a ratio of 1.0 indicates no change and ratios greater and less than 1.0 indicate increases and decreases respectively. The asterisks indicate the results of the first test and mark those proportions which are not statistically different from 1.0. The second test was the same as for Table 3, where the brackets indicate groups of causes within which the chi-square analysis showed there to be no significant difference. (Those already shown not to be different from 1.0 were not compared in the second test, however.)

Motor vehicle accidents showed the greatest change over time, with the percentage more than doubling since FY 1972. While it is currently the second leading cause of injuries it was only fifth in FY 1972. Machinery and industrial type accidents showed nearly the same magnitude change as did motor vehicle accidents but in the opposite direction.

This type of injury is now at less than one half the level occurring during FY 1972, dropping from the second to the fifth leading cause. Falls, the leading cause of injury in both years, showed no significant change over time nor did injuries from cutting and piercing instruments, fire-arms, fire, or excessive cold.

The average change for the bracketed group that showed significant increases over time, but within which the increases were not statistically significant from one another, was an increase of approximately 56 percent. The average change for the other bracketed group was a decrease of 25 percent.

There were notable differences by age in the prevalence of the various causes of accidents and injuries as illustrated by the data in Table 5. Motor vehicle accidents occurred disproportionately among those 15-19 and 20-24 years old in FY 1978 and was the leading cause of hospitalizations for injuries in these two age groups. Suicide was also an important cause of injury for these two age groups and to a lesser extent for those age 25-44. Injuries resulting from poisons and fire appear as major causes only for those less than four years old, ranking second and fifth respectively for that age group. Although falls was a major cause of injury in all age groups, it occurred most disproportionately among those 65 and over for whom it occurred more than 4 times as often as any other cause. Injuries purposely inflicted by others was in the top five causes only for those 15 and over and was of greatest importance for those 20-24 and 25-44.

Outpatient Treatment of Accidents and Injuries

By far the largest majority of injuries among Alaska Natives are treated on an outpatient rather than an inpatient basis. Such outpatient treatment is performed either by staff at IHS direct or contract outpatient facilities or else by Community Health Aides in village clinics. Because of a lack of available information, the outpatient data in this report do not reflect Health Aide treatment of injuries. As such, the data reported only partially reflect the magnitude and patterns of outpatient treatment of accidents and injuries. A cursory estimate based on what Health Aide data is available indicates that the inclusion of Health Aide treatments of injuries would boost the overall volume of outpatient injury treatment by at least 30 to 50 percent.

During fiscal year 1978 there were 16,197 first visits to IHS direct and contract outpatient facilities for the treatment of accidents and injuries. This is over seven times the number of inpatient admissions and corresponds to a rate of 246 first visits per 1,000 Alaska Natives, or approximately one first visit for every four Alaska Natives. This treatment rate has remained approximately the same since FY 1972 when the rate was 229 per thousand. It is not possible to make any conclusions regarding the actual trend in the occurrence of accidents and injuries from this information as changing treatment patterns (such as the shift away from inpatient treatment or towards Health Aide treatment of injuries) may exert equal or greater influences on the treatment rates than would changes

in the actual number of injuries occurring. However, some indication that the occurrence rate is relatively stable is evidenced by the fact that the percent of total first visits (excluding supplemental care) each year attributable to accidents and injuries, currently at 11.6 percent, has fluctuated by less than one percent over the last seven years.

Age differences in outpatient treatment of injuries. Age specific rates for first visits for treatment of accidents and injuries are presented in Table 6 and are graphed in comparison to the corresponding inpatient rates in Figure 6. (The rates are graphed on a semi-log scale so that equivalent rates of change are evidenced by parallel lines). The outpatient rate is lowest for those age 0 to 4 and nearly as low for those 5 to 9 (the difference was not statistically significant as indicated by the brackets in the table). Starting at age 10 the rate increases to a peak in the 20 to 24 year old group and then declines continuously until the rate for those 65 and older is again nearly as low as for the youngest two age groups. The outpatient age trend, as evidenced in the graph, is nearly the same as that for inpatients. The lines are nearly parallel, except that the distance between them decreases with age and the outpatient line does not level off after age 45 as it does for inpatients.

Outpatient treatments of injuries by cause. Table 7 presents patient first visits for treatments of accidents and injuries by cause for FY 1978. (Data presented are for IHS direct facilities only as contract data was not available). Causes are listed in descending order of importance except for the "other" category and as before the brackets indicate those causes with rates which are not statistically different from each other. While the outpatient cause categories do not correspond exactly to those used for inpatient, certain comparisons can still be made. As with the inpatient data, accidental falls was the leading cause of outpatient treated injuries. However, injuries purposely inflicted by others and injuries from cutting and piercing instruments follow falls as the next leading causes for outpatient visits as opposed to motor vehicle accidents in the case of inpatient treatments. Some of the observed differences between the inpatient and outpatient lists are indicative of the relative severity of particular types of accidents and the corresponding levels of treatment required. Conversely, many types of accidents (e.g. falls) can potentially produce a wide range of severity of injuries and thus may be equally likely to be treated on an outpatient as well as an inpatient basis. Another factor producing similarities in the rankings would be single injuries treated first on an inpatient basis followed up by outpatient visits. This situation could result in the recording of the injury on both inpatient and outpatient forms.

Table 8 shows proportional changes in outpatient visits by cause since FY 1972 in the same manner as presented in Table 4 for inpatients. Five of the causes remained essentially stable over time, showing ratios not statistically different from 1.0. Accidental poisonings showed by far the largest increase in proportion of the total. This is in direct

contrast to the fact that it showed the second largest decrease in the inpatient data. Some of this difference might be explained by a shift from inpatient to outpatient treatment of poison victims but the increase in the outpatient treatment far exceeds the decline in inpatient treatments, indicating other factors must be operating as well. Motor-vehicle accidents showed the only other statistically significant increase, a trend consistent with the inpatient data. Injuries caused by fire and flame, animals, cutting and piercing instruments, and environmental factors all showed statistically the same amount of decline, while falls showed a significant, but slightly smaller decline.

Summary and Conclusions

The data on deaths, hospitalizations, and outpatient visits due to accidents and injuries presented in this report all indicate that it is a major health problem for Alaska Natives. Although, the data indicate relatively high and gradually increasing trends in overall accident and injury rates, the changes of greatest significance occurred in the breakdown of accidents and injuries by cause and demographic characteristics. Most notable of these were the rise over time of motor vehicle accidents as a major cause of injury and death and the increasingly disproportionate concentration of injuries among those in their teens and early twenties. These two trends in fact are interrelated as motor vehicle accidents also occur disproportionately among that same age group.

While the relative magnitude of accidents as a health problem (as measured by deaths) among Alaska Natives was indicated in the introduction as being unique in comparison to the total U.S., it is similar in magnitude to that of the non-Native population of Alaska for whom accidents is also the leading cause of death. This suggests that, unlike some other health problems which are strictly peculiar to the Native condition or lifestyle, accidents and injuries are more generally related to conditions in the state to which all Alaskans are more or less equally exposed. In any case, since accidents and injuries is a lifestyle related health problem, its reduction is contingent on the elimination of hazardous activity or on the promotion of the use of appropriate safety precautions.

REFERENCES

- Buffler, Patricia A. and Robert F. Kraus. The Population and Communities of Alaska. Unpublished paper prepared for the Washington, Alaska, Montana and Idaho Program for Medical Education, University of Alaska, Fairbanks.
1978
- State of Alaska, Department of Health and Social Services.
1978 "Alaska Vital Statistics 1977".

Table 1: THREE YEAR AVERAGE CAUSE-SPECIFIC ACCIDENTAL DEATH RATES, ALASKA NATIVES
1959-61, 1969-71, 1975-77*

	1975-77		1969-71		1959-61	
	Number	Rate	Number	Rate	Number	Rate
Total	407	213.7	324	213.2	265	205.0
Motor Vehicle	86	45.2	41	27.0	22	17.0
Drowning	61	32.0	45	29.6	44	34.1
Water Transportation	50	26.3	59	38.8	39	30.2
Fire	34	17.9	39	25.7	57	44.1
Excessive Cold	27	14.2	14	9.2	8	6.2
Aircraft	22	11.6	23	15.1	4	3.1
Firearms	15	7.9	21	13.8	14	10.9
Poisons	15	7.9	12	7.9	15	11.6
Falls	11	5.8	9	5.9	9	7.0
Suffocation	10	5.3	17	5.7	24	18.6
Other	76	39.9	44	29.0	29	22.4

* The brackets indicate groups of causes in 1975-77 within which differences were found to be not statistically significant using a chi-square test and the .05 level of significance.

Source: State of Alaska, Office of Information Systems (number of deaths by cause, excluding purposely inflicted).

Table 2: AGE-SPECIFIC IHS DIRECT AND CONTRACT HOSPITALIZATION RATES FOR TREATMENT OF ACCIDENTS AND INJURIES, ALASKA NATIVES, FY 1978

AGE	Total Discharges for Accidents and Injuries, FY 1978	Population based on percentage break- down estimated by:		Rate per 1,000 pop- ulation based on estimates of:	
		IHS	Buffler and Kraus	IHS	Buffler and Kraus
Total	2240	65857	65857	34.0	34.0
0-4	105	8700	10145	12.1	10.4
5-9	92	10448	8072	8.8	11.4
10-14	199	9551	8098	20.9	24.6
15-19	333	7382	7946	45.1	41.9
20-24	408	4908	6418	83.1	63.6
25-44	702	14799	14353	47.4	48.9
45-64	298	7511	8110	39.7	36.7
65+	103	2558	2715	40.3	37.9

Sources: IHS Inpatient Reports 2B and 3H (discharges) Buffler and Kraus, 1978 (percentage distribution of population by age).

**Table 3: IHS DIRECT AND CONTRACT HOSPITALIZATIONS FOR TREATMENT OF ACCIDENTS AND INJURIES BY CAUSE, ALASKA NATIVES
FY 1978***

Cause	Hospital Discharges	
	Number	Percent
Total	2240	100.0
Falls	456	20.3
Motor Vehicle	330	14.7
Injuries purposely inflicted by others	246	1.0
Injuries undetermined whether purposely inflicted	179	8.0
Machinery Industrial-type	145	6.5
Surgical, Medical	136	6.1
Suicide Attempt	122	5.4
Cutting and Piercing Instruments	86	3.8
Water Transportation	65	2.9
Poisons	48	2.1
Fire	44	2.0
Firearms	42	1.9
Excessive Cold	33	1.5
Other	308	13.8

* The brackets indicate groups of causes within which differences were found to be not statistically significant using a chi-square test and the .05 level of significance.

Source: IHS Inpatient Reports 2B and 3H

Table 4: RATIO, FY 1978:FY 1972, OF PERCENT OF TOTAL IHS
DIRECT AND CONTRACT HOSPITALIZATIONS FOR TREAT-
MENT OF ACCIDENTS AND INJURIES BY CAUSE, ALASKA
NATIVES*

Cause	Ratio FY 1978:FY 1972
Motor Vehicle	2.37
Water Transportation	1.63
Surgical Medical	1.54
Injuries undetermined whether purposely inflicted	1.50
Cutting and piercing instruments	1.25*
Falls	0.94*
Injuries purposely inflicted by others	0.86
Firearms	0.81*
Fire	0.75*
Suicide Attempt	0.72
Excessive Cold	0.69*
Poisons	0.67
Machinery, Industrial-type	0.45

* Asterisks indicate ratios not significantly different from 1.0 (indicating no statistically significant change over time), brackets indicate groups of ratios (excluding those with asterisks) within which differences were not statistically significant. Both tests used the chi-square statistic and the .05 level of significance.

Table 5: PERCENT DISTRIBUTION OF TOTAL IHS DIRECT AND CONTRACT HOSPITALIZATIONS FOR ACCIDENTS AND INJURIES BY CAUSE AND AGE, ALASKA NATIVES, FY 1978*

Cause	Total	A G E							
		0-4	5-9	10-14	15-19	20-24	25-44	45-64	65+
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Motor Vehicle	14.7	11.4	10.9	16.1	19.5	18.4	13.0	11.7	9.7
Water Transportation	2.9	--	--	--	--	2.7	4.4	5.0	--
Poisons	2.1	13.3	--	--	--	1.7	1.4	2.3	--
Falls	20.3	12.4	33.7	27.1	16.2	13.5	16.2	29.2	46.6
Fire	2.0	6.7	--	4.0	--	1.7	0.9	2.7	--
Excessive Cold	1.5	--	--	--	--	--	2.1	1.7	--
Firearms	1.9	--	--	--	3.6	3.7	1.1	--	--
Cutting, Piercing Instrument	3.8	6.7	--	5.5	4.2	4.1	4.6	--	--
Machinery, Industrial-type	6.5	18.1	13.0	9.0	5.4	4.2	4.6	--	--
Surgical, Medical	6.1	5.7	9.8	5.5	4.8	3.2	7.4	6.7	8.7
Suicide Attempt	5.4	--	--	--	11.1	7.8	6.3	1.7	--
Injuries purposely inflicted by others	11.0	4.8	--	--	7.8	15.4	16.0	10.4	4.9
Injuries undetermined whether purposely inflicted	8.0	--	6.5	6.5	12.3	9.8	7.5	6.4	--
Other (excluding blank cells)	13.8	20.9	26.1	26.3	15.1	13.8	14.5	22.2	30.1

* Percentages were not calculated for cells in which there were less than five hospitalizations

Source: IHS Inpatient Reports 2B and 3H

Table 6: IHS DIRECT AND CONTRACT OUTPATIENT FIRST VISITS FOR
TREATMENT OF ACCIDENTS AND INJURIES BY AGE AND AGE-
SPECIFIC RATES, ALASKA NATIVES*, FY 1978

AGE	Total First Visits	Rate per 1000 Population
Total	16197	245.9
0-4	1247	122.9
5-9	1069	132.4
10-14	1795	221.7
15-19	2566	322.9
20-24	2448	381.4
25-44	4704	327.7
45-64	1696	209.1
65+	377	138.9
Unknown	295	--

* The brackets indicate groups within which differences were found to be not statistically significant using a chi-square test and the .05 level of significance.

Source: IHS Outpatient Reports 1C and 3A

Table 7: IHS DIRECT OUTPATIENT FIRST VISITS FOR TREATMENT OF ACCIDENTS AND INJURIES BY CAUSE, ALASKA NATIVES, FY 1978*

	First Visits	
	Number	Percent
Total	15827	100.0
Falls	4027	25.4
Injuries purposely inflicted by others	1456	9.2
Cutting and Piercing Instruments	1403	8.9
Motor Vehicle	1318	8.3
Environmental Factors	657	4.0
Animal Related	357	2.3
Machinery, Industrial-type	340	2.2
Fire	252	1.6
Poisons	214	1.4
Suicide Attempt	149	0.9
Water Transportation	97	0.6
Firearms	89	0.6
Other and Undetermined	5468	34.5

* The brackets indicate groups within which difference were found to be not statistically significant using a chi-square test and the .05 level of significance.

Source: IHS Outpatient Report 1E

Table 8: RATIO, FY 1978:FY 1972, OF PERCENT OF TOTAL IHS
DIRECT OUTPATIENT FIRST VISITS FOR TREATMENT OF
ACCIDENTS AND INJURIES BY CAUSE, ALASKA NATIVES*

Cause	Ratio FY 1978:FY 1972
Poisons	3.86
Motor Vehicle	1.12
Firearms	1.04*
Machinery, Industrial-type	1.03*
Water Transport	0.97*
Injuries purposely inflicted by others	0.93*
Suicide Attempt	0.90*
Falls	0.85
Fire	0.80
Animal Related	0.74
Cutting and Piercing Instruments	0.72
Environmental Factors	0.70

* Asterisks indicate ratios not significantly different from 1.0 (indicating no statistically significant change over time), brackets indicate groups of ratios (excluding those with asterisks) within which differences were not statistically significant. Both tests used the chi-square statistic and the .05 level of significance.

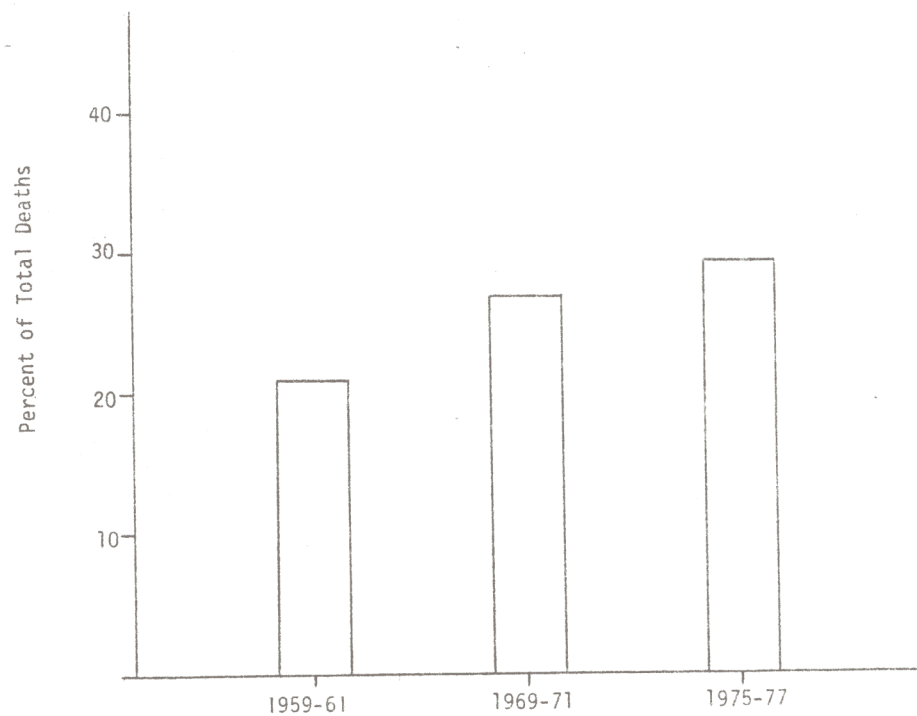
Figure 1: BREAKDOWN OF ICDA EXTERNAL CAUSE OF INJURY CODES ("E" CODES) BY CAUSE CATEGORIES FOR INPATIENT, OUTPATIENT AND DEATH DATA

Cause	ICDA "E" Codes for Indicated Type of Data		
	Deaths	Inpatient	Outpatient
Motor Vehicle	810-823	810-823	810-823
Water Transportation	830-838	830-838	830-838
Aircraft	840-845	840-845	840-845
Poisoning	850-877	850-877	850-877
Falls	880-887	880-887	880-887
Fire	890-899	890-899	890-899
Environmental Factors	*	*	900-904 907-909
Excessive Cold	901	901	*
Animal Related	*	*	905-906
Drowning	910	910	910
Suffocation	911-912	*	*
Firearms	922	922	922
Cutting and Piercing Instruments	*	920	920
Machinery	*	*	928
Machinery, Industrial-type	*	916-919, 921 923-928	*
Surgical Medical	*	930-936	*
Suicide Attempt	N/A	950-959	950-959
Injuries purposely inflicted by other	N/A	960-978	960-967, 969, 968 (part)
Injuries undetermined whether purposely inflicted	N/A	980-989	*
Other	Remainder	Remainder	Remainder

* Not a separate category, included elsewhere

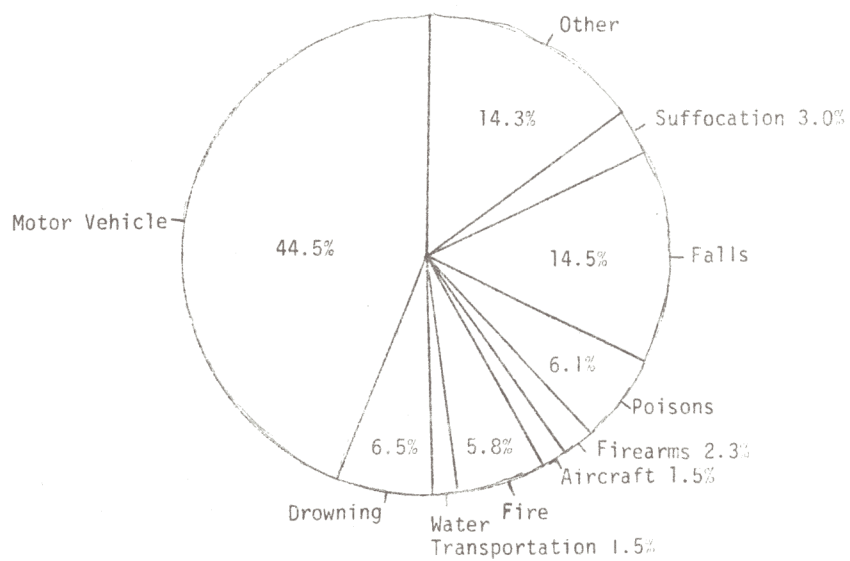
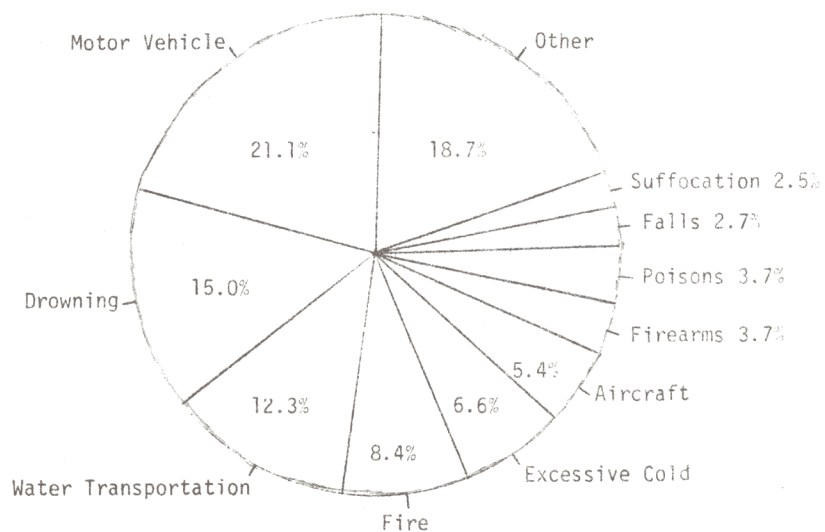
N/A The death statistics used cover only accidental deaths and thus do not include codes of 950 or above

Figure 2. Accidental Deaths as a Percent of Total Deaths, Alaska Natives FY 1959-61, FY 1969-71, FY 1975-77.



Source: State of Alaska, Office of Information Systems (raw data)

Figure 3. Percent Distribution of Accidental Deaths by Cause, Alaska Native 1975-77, U.S. Total Population 1975.



U.S. Total Population

Figure 4. IHS Direct and Contract Hospitalization Rate for Accidents and Injuries and Estimated Serious Accident Rate, Alaska natives FY 1972-FY 1978.

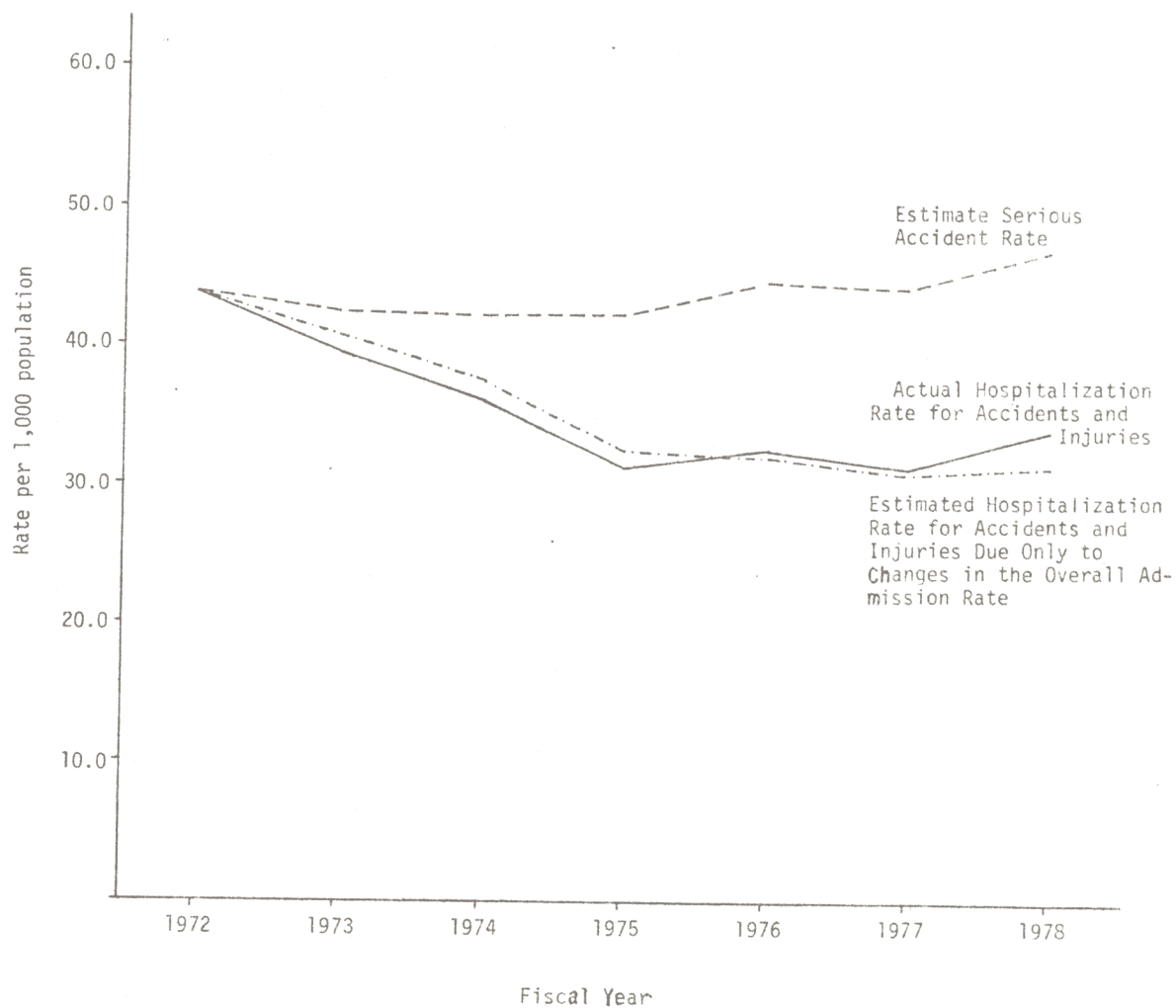
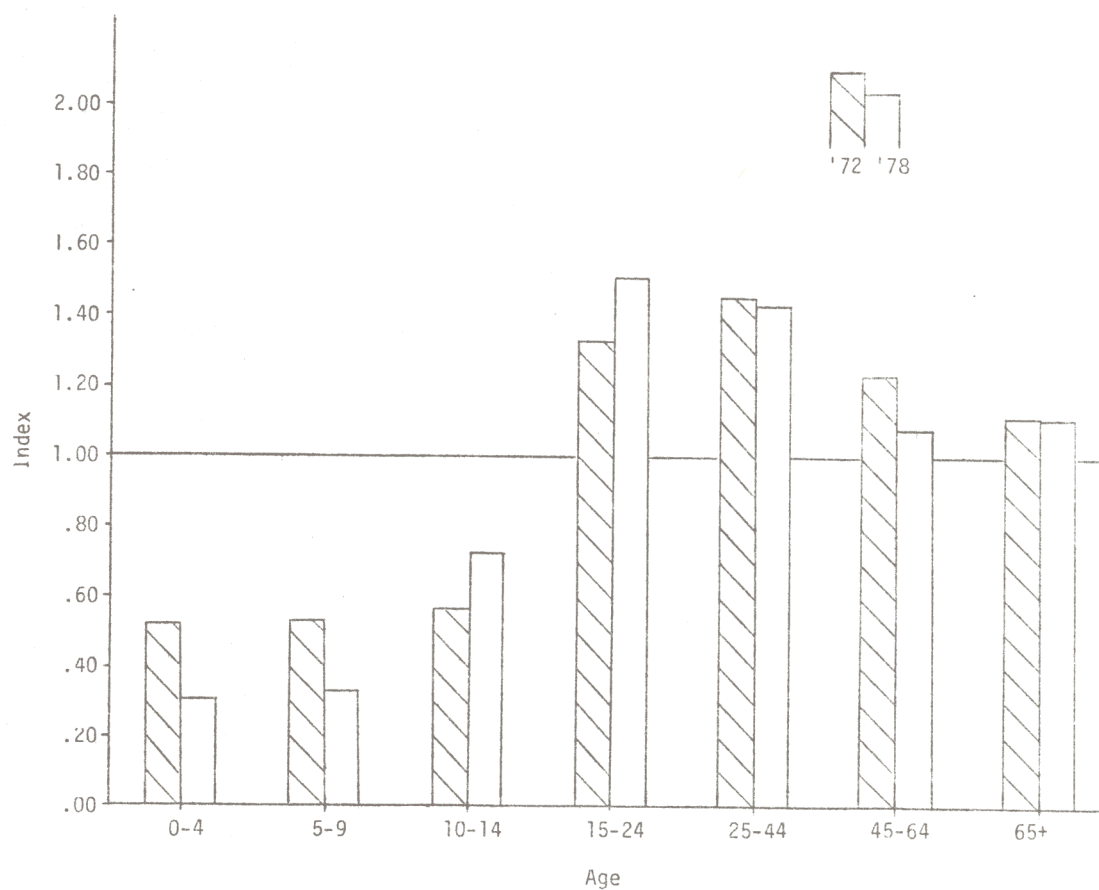


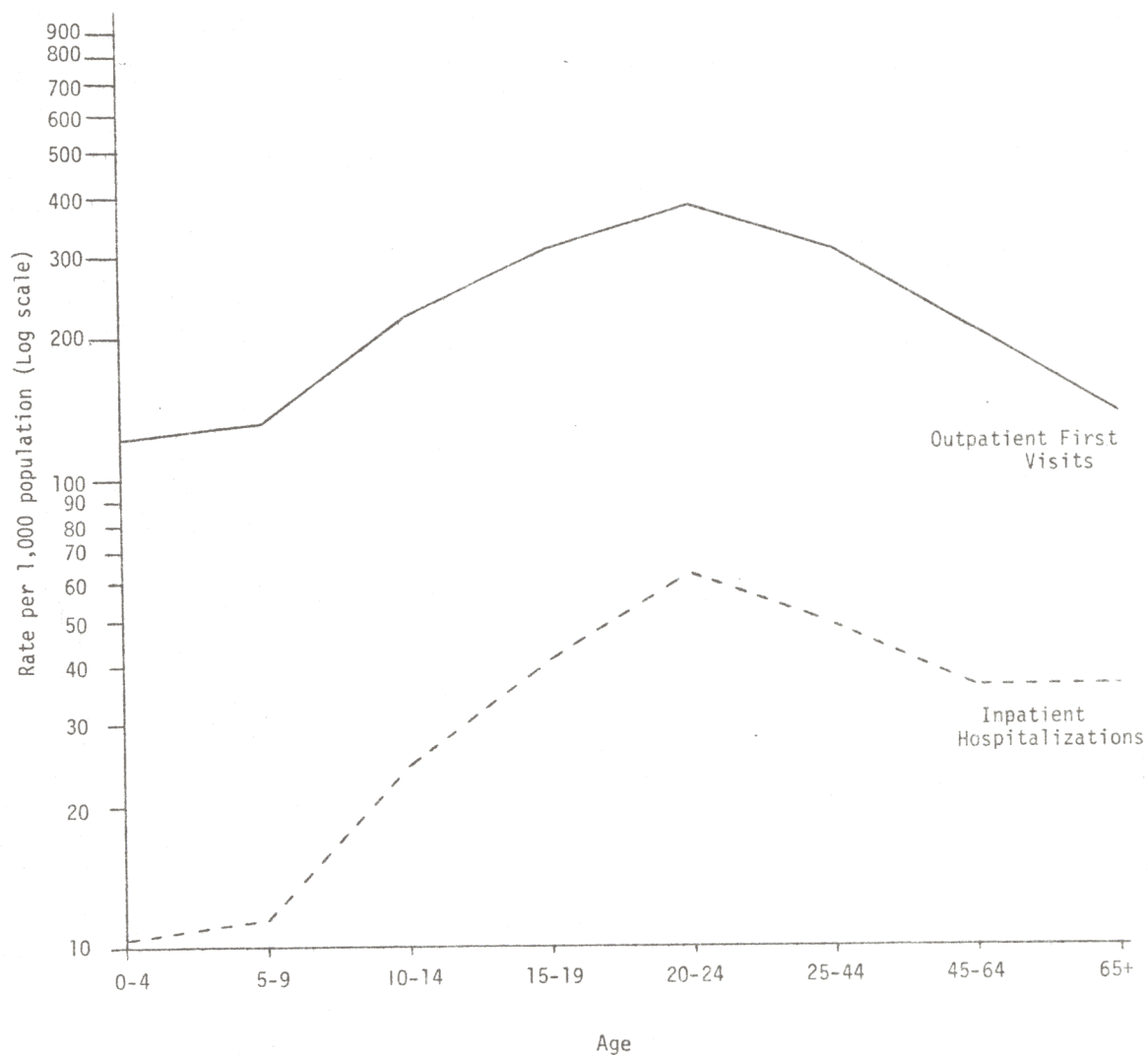
Figure 5. Relative Index of IHS Direct and Contract Hospitalizations for Accidents and Injuries by Age Group, Alaska Natives FY 1972, FY 1978.*



*Index = $\frac{\text{proportion of total discharges for accidents and injuries in the age group}}{\text{proportion of the total population in the age group}}$.

Source: IHS Inpatient reports 2B and 3H

Figure 6. Age-specific Rates for IHS Direct and Contract Outpatient First Visits and Inpatient Hospitalizations for Treatment of Accidents and Injuries, Alaska Natives FY 1978.



Source: IHS Inpatient reports 2B and 3H, Outpatient reports 1C and 3A